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Optical properties and crystal chemistry of synthetic rutile implanted with cobalt ions

Bakhtin A., Lopatin O., Khaibullin R., Khaibullin I.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Implantation of high-energy cobalt ions into plates of synthetic rutile has been studied, and absorption, luminescence, and luminescence excitation spectra have been recorded and interpreted. Long-wave luminescence (820 nm) of TiIV 3+ ions in rutile has been revealed; its intensity increased after the cobalt implantation. Analysis of luminescence and luminescence excitation spectra has allowed us to specify the scheme of electron energy levels of rutile and to establish the energy levels of impurity Ti3+ ions occupying vacant octahedrons with the C2h symmetry in structure of the mineral. © Pleiades Publishing, Ltd. 2007.

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